

Serial No. 10/034,054

Attorney Docket No. PCI-784

Remarks

The Applicant has amended claim 1, and has revised certain paragraphs of the specification in response to the Examiner's objections.

Claim Rejections

The Examiner made the following rejections:

<u>Claim</u>	<u>Basis</u>	<u>Grounds</u>
1	103(a)	Kawase in view of Thorton
2-5, 7, 8, 16	103(a)	Kawase & Thorton, in view of Simpson
12, 14, 15	103(a)	Kawase, Thorton & Simpson i/v/o Basilewsky

The applicant will briefly discuss each reference before addressing these rejections.

Kawase (JP-11-93830)

Kawase discloses a device in which a magnetostrictive actuator moves a conventional reciprocating piston 3 in a conventional chamber. The device is unbalanced and requires the use of sliding seals which are susceptible to wear. Because the majority of the pumping element is not magnetostrictive, there is significant inertia which must be overcome by the magnetostrictive actuator in pumping.

Thorton et al. (US 5,129,789)

Thorton et al. disclose a vibration-type pump, in which a single internal volume is used to pump fluid through the magnetostrictive element 12. Magnetostrictive contraction, rather than expansion, is the key motive element relied upon, and Thorton et al. indicate that doing so results in a subtractive relationship between length and radius change - meaning, that the contraction mode taught by Thorton et al. would result in much lower displacement values than if the expansion mode was relied upon.

Simpson et al. (US5,203,172)

Simpson et al. disclose a electromagnetically powered reciprocating piston engine. The pumping action is made possible by a reciprocating piston 50 that is attracted to pulsed external electromagnetic poles.

Basilewsky (US2,690,128)

Basilewsky discloses a pumping device in which a piston 26 is free to reciprocate in a tube, and wherein movement the piston is effected by attraction to pulsed external electromagnetic poles.

Claim 1, As Amended

The combination of Kawase and Thorton et al. would yield a device in which does not differ substantially from Kawase. As mentioned above, Kawase discloses the use of a magnetostrictive actuator and a conventional piston. Thorton et al. does not disclose or use any use of a piston. Claim 1 cannot possibly teach anything other than a conventional piston, and thus claim 1 cannot be obviated by this prior art combination.

Other combinations of the cited art also cannot properly render claim 1 obvious. Simpson et al. and Basilewsky both disclose piston devices, however, both teach

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devices in which the piston has a constant shape and diameter, and travels from one end to the other end of a cylinder under the influence of an external force. Similarly, Kawase discloses a constant shape and diameter piston which is moved by an external actuator (i.e. the magnetostrictive actuator). Accordingly, no combination of these reference can provide a sustainable basis for a finding of *prima facie* obviousness of claim 1 simply because all references teach that a piston requires an external force acting on the piston to move it from one end of a cylinder to another. Accordingly, amended claim 1 is believed to be allowable over the art of record.

Claims 2-5, 7, 8, 16

Claims 2-5 are believed to be allowable as depending from an allowable base claim.

The Applicant notes that the Examiner has *improperly* rejected claims 7, 8, 16, as the Examiner has failed to provide a basis for the obviousness all elements of the claims (see MPEP 706.02(j)). Furthermore, in order to make a sustainable finding of *prima facie* obviousness, "there must be a reasonable expectation of success of the alleged combination" (also MPEP 706.02(j)). Still further, the Examiner has not established that the motivation for the combination is found in the prior art (also MPEP 706.02(j)). For any one of these reasons, the rejections would be fatally defective. The rejections are thus clearly improper and should be removed.

The Examiner has not demonstrated all elements of claims 7, 8 and/or 16 (among others) are taught by the alleged combination. For example, the following elements are claimed but not demonstrated by the Examiner to be taught by the prior art:

[Claim 7]

"first and second pumping chambers within said housing at opposite ends of a lengthwise extent of said magnetostrictive element, each of said pumping chambers mechanically coupled to said actuator, to compress as said actuator extends in length."

[Claim 16]

"driving a first pumping chamber through said extension of a first end of said two opposing ends; driving a second pumping chamber through said extension of a second of said two opposing ends, opposite said first end, wherein said first pumping chamber is driven in phase with said second pumping chamber."

The Examiner has also not explained how the alleged combination of Kawase & Thorton et al. and Simpson et al. would be expected to work. As mentioned above, all of these references (except Thorton et al.) require an external motive force to move their pistons, and none use both or opposite ends of any actuating device to pump different chambers. If any combination of the electromagnetic actuators and/or pistons of Simpson were magnetostrictive, the device would not work as taught. *How would the piston be forced from one end of the cylinder to the other? How would the magnetostrictive element be positioned? How would the chambers be configured? How*

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would the pumping be effected? The Applicant denies that the prior art teaches the combination alleged by the Examiner. A proper case for *prima obviousness* has not been established by the Examiner.

Furthermore, the Examiner has not indicated what motivation one skilled in the art would have to modify the references as alleged. Though the Examiner mentions "balanced operation", the Applicant points out that the Examiner must find his motivation in the prior art, and not in the Applicant's disclosure. There is no such teaching of the desirability of "balanced operation" in the prior art.

Still further, the Applicant also respectfully points out that "balanced operation" is not properly equated with "in phase" operation, which is a term having a specific technical meaning.

In summary, the rejection of claims 7, 8 and 16 is deficient because of the following reasons, any one of which is fatal to the rejection: (a) the Examiner has not established that all elements of claims are found in the prior art; (b) the Examiner has not established that the motivation for the combination is found in the prior art; and (c) the Examiner has not established that there would be a reasonable expectation of success in making the alleged combination.

Removal of the rejection is respectfully requested.


Claims 12, 14, 15

Claims 12, 14 and 15 are believed to be allowable, as depending from an allowable claim base.

The application is believed to be in a condition for allowance, and allowance is therefore respectfully requested. If the Examiner has further concerns regarding the condition of this application, please contact the undersigned at 450-647-2847 so that such concerns may be resolved expeditiously.

24 July 2003

Respectfully submitted,



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